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ANNUAL REPORT

1961

BURLINGTON - DRURY LANE

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Burlington Drury Lane : water pollution control plant.

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ANNUAL REPORT

ON

BURLINGTON - DRURY LANE

SEWAGE TREATMENT PLANT

OWRC PROJECT - 60-S-51

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BURLINGTON - DRURY LANE

SEWAGE TREATMENT PLANT

OPERATED FOR

THE TOWN OF BURLINGTON

BY

THE ONTARIO WATER RESOURCES COMMISSION

Mr. A. M. Snider - Chairman
Dr. A. E. Berry - General Manager
Mr. D. S. Caverly - Assistant General Manager,
and Director of Plant Operations
Mr. B. C. Palmer - Assistant Director,
Division of Plant Operations
Mr. M. B. Fielding - Project Engineer,
Division of Plant Operations

Prepared by the
Division of Plant Operations

GENERAL

The Drury Lane Sewage Treatment Plant, located in the heart of the Town of Burlington, is an activated sludge type plant recently enlarged to a capacity of 2.5 million gallons per day average flow for full treatment. Provision has been made for primary treatment of flows reaching an average of 5.0 mgd. The consulting engineer for the expansion was James F. MacLaren Associates of Toronto with Frid Construction the prime contractor.

PLANT DESCRIPTION

Sewage is pumped to the plant and enters the grit channels through one inch bar screens. The velocity of flow through the channels is maintained at approximately one foot per second by means of proportional weirs at the outlet end. Three channels are provided, one of which is a recent addition, and the capacity is such that any two will accept a flow of 5.0 mgd. The grit and screenings are removed manually to a concrete drain pad and then trucked away.

From the grit channels the sewage flows by gravity to an influent channel from which it is proportioned between two primary tanks. Normally, the flow to each will be equal but stop logs are provided so that either tank may be isolated.

The primary tanks are both of the rectangular type, each 49.33 feet in length, 18.0 feet wide and have an average depth of 12.25 feet. The total capacity is 21,750 cubic feet (135,700 gallons) giving a retention period of 1.3 hours at design flow. Sludge is moved to hoppers continuously by flight collectors incorporating scum removal blades. From the hoppers, the collected

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sludge is pumped to the digesters on an automatic time cycle. The primary tank effluent is discharged over end weirs. The primary tanks are part of the old plant, no additions having been made during the recent expansion with the exception of additional adjustable weirs.

The primary effluent flows to the aeration tanks through a channel equipped with stop gates to control the flow proportioning. Normally each of the two aeration tanks get equal flow, but either one may be removed from service.

Each aeration tank is 320 feet long, 18 feet wide and 11 feet deep. The capacity of the combined aeration tanks is 788,000 gallons giving a retention period of 6.05 hours at design flow.

Air supply is by diffusers, 268 2-tube fine assemblies and 82 course type. The blowers are housed in the main control building. Two blowers of 750 cubic feet per minute capacity were in the old plant and a new 1500 cfm blower was installed during the recent expansion.

The two circular final tanks were built as part of the expansion program. Each is 50 feet in diameter with a 10.6 foot water depth. The total capacity of the final tanks is 260,000 gallons giving a retention period of 2.5 hours at design flow.

Sludge in the final tanks is continuously removed by "Rex Unitube Tow-Bro" mechanisms which depend on hydro-static pressure on a rotating header pipe to effect removal. Each revolution of the unit cleans the entire tank bottom, without having to move the sludge to a central hopper. The sludge may be returned to the

aeration tank as seed for the process or to the primary tanks for removal to the digesters. Pumping of the return sludge is done by one of two units, each having a capacity of 0.65 mgd against a total head of 28 feet at full speed. The speed and therefore the rate of return is variable.

The final effluent flow is metered and chlorination facilities are provided. The effluent is also used in the flushing water system and the spray system for foam control in the aeration tanks. The chlorinated effluent is discharged to a gravity sewer leading to Lake Ontario.

Two stage digestion is provided for the solids before eventual disposal by tank truck to nearby farms.

There are two primary digesters with a total capacity of 50,000 cubic feet and one secondary digester with a capacity of 25,000 cubic feet.

Prior to the expansion of the plant, the two digesters now used as primaries were used as one primary and one secondary. A new secondary digester was built and the two existing tanks were converted to primary digestion.

All three tanks are heated by two dual fuel P.F.T. Heat Exchangers each with a capacity of 250,000 B.t.u. per hour. The temperature of the sludge is thermostatically controlled. Pumps are provided for recirculation of the sludge and may also be used for transfer of the sludge from one tank to another. Sludge removal or transfer is accomplished by a manually operated positive displacement pump.

PLANT OPERATION

The original Drury Lane Sewage Treatment Plant was operated by the Town of Burlington, but at the time of the expansion, responsibility for operation was assumed by the Division of Plant Operations of the OWRC. Project Engineer for the plant was Mr. A. C. Beattie who turned over supervision to Mr. M. Fielding in July of 1961. The chief operator, Mr. John McNamara, and his four man staff were engaged in February, 1961. Mr. McNamara came to the Burlington plant from the OWRC plant in London.

The initial operation of the plant was plagued by the normal difficulties associated with a new plant, compounded in this case by the fact that sewage flow was maintained throughout the construction of the additional units.

Operation of the entire plant was put on a routine basis late in August. At this time, the equipment was generally operating satisfactorily and the staff began recording, on a regular basis, the daily flows, operating procedures and operating conditions. The routine sampling of wastes and analysis by the OWRC laboratory werealso initiated at this time.

Arrangements were made for the disposal of liquid digested sludge by tank truck but various difficulties arose and it was not until December that it was felt that this disposal was satisfactory. Prior to OWRC operation of the plant, the disposal of sludge was handled by a Town truck but this vehicle proved inadequate for the amounts of sludge produced. Therefore, a contract was let to

Mr. D. Veri of Hannon.

Difficulties were also encountered in the operation of the plant as an activated sludge type sewage treatment plant and extensive experimentation was done in an attempt to find the optimum conditions for efficient operation. The results were encouraging and at the year end experiments were still being done in an attempt to make the operation even more efficient. It is felt that a stable condition will be reached in the near future.

PLANT PERFORMANCE

Performance data for the Drury Lane Plant is available only for the period from August to December of 1961. However, it is felt that this data is representative of the flows which will be obtained throughout the year.

Graph No. 1 (attached) shows the average daily flows (plotted on a weekly basis) for the period during which records were kept. On the basis of these records, the average flow is approximately 2.01 mgd. The total amount of sewage treated during the time the plant has been in full operation was 258.6 million gallons. Extrapolating the recorded data it is estimated that this plant receives an annual flow of 750 million gallons.

Graph No. 2 shows the BOD and suspended solids content of the incoming sewage as determined by tests of samples submitted to the OWRC laboratory. The average BOD of the sewage as it entered the plant is 190 ppm with a minimum and maximum recorded value of 40 ppm and 840 ppm respectively. The average, minimum and maximum values recorded for the suspended solids content in the influent

were 227 ppm, 102 ppm and 1192 ppm respectively. The average reduction of BOD by treatment was 84.7%. A suspended solids reduction of 85.0% was obtained.

It is felt that the percentage reduction of BOD and suspended solids can be raised by further experimentation with the operating conditions of the plant.

During 1961, industrial wastes presented some problem to efficient operation. Discharge of "tall oil" is received which has an extremely high pH and forms a white emulsion with water. The problem is presently under investigation by the Industrial Waste Division of the OWRC and relief from the condition is expected in the near future.

OPERATING COSTS

The Drury Lane Plant has not been in full operation for an entire year, but cost data is presented herewith based on the figures obtained during the time that full treatment facilities were used.

The total operating cost for 1961 was $38,823.13. The plant was placed in full operation in August and for the period from August to December 31 the operating cost was $21,416.00. During this period the plant received 258.6 million gallons of sewage containing approximately 500,000 pounds of BOD and 600,000 pounds of suspended solids. As noted previously, the treatment removed 84.7% of the BOD (416,000 lbs.) and 85% of the suspended solids (500,000 lbs.).

The cost of treatment therefore was approximately $83.00 per million gallons of sewage treated. This is also the equivalent for 5.2¢ per pound of BOD removed, or 4.3¢ per pound of suspended solids removed.

The operating costs are broken down as follows:

Payroll	47.0%
Fuel	4.1
Power	13.0
Chemicals	8.4
General Supplies	3.2
Equipment	0.9
Repairs and maintenance	0.3
Sundry (including sludge haulage)	22.5
Water	0.6

The total cost to the Town for 1961 was as follows:

Operating	$ 38,823.00
Debt Retirement	13,571.00
Reserve	2,851.00
Interest	21,510.00
TOTAL	76,755.00

Because the plant was not in full operation for the entire year, the total costs incurred by the plant cannot be reasonably proportioned as to the amount of sewage treated.

The estimated operating budget for 1962 is as follows:

Payroll	$ 24,000.00
Fuel	2,000.00
Power	6,000.00
Chemicals	3,200.00
General Supplies	1,600.00
Equipment	800.00
Repairs and Maintenance	600.00
Sludge Haulage	6,000.00
Sundry	7,800.00
TOTAL	52,000.00

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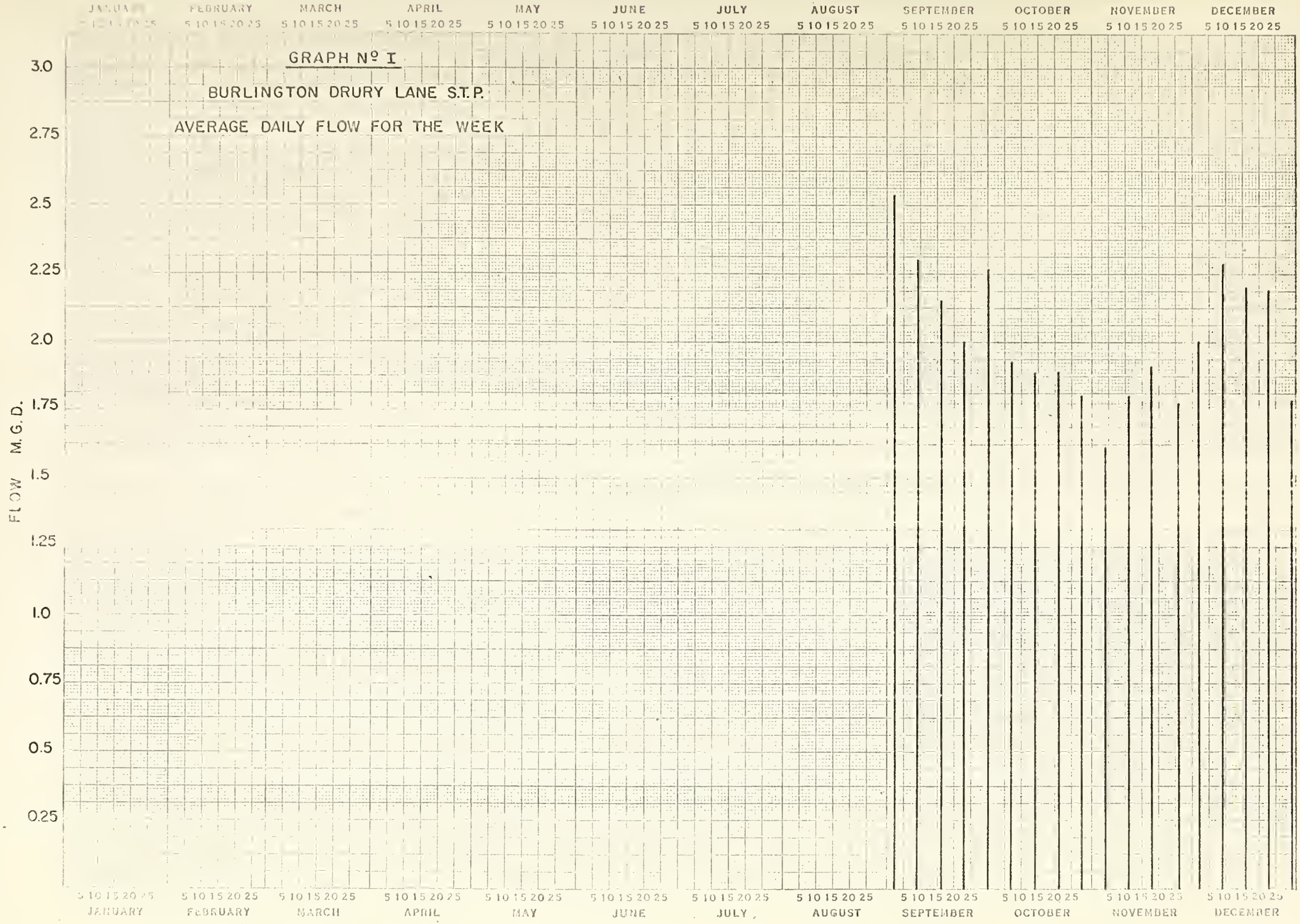
CALENDAR YEAR



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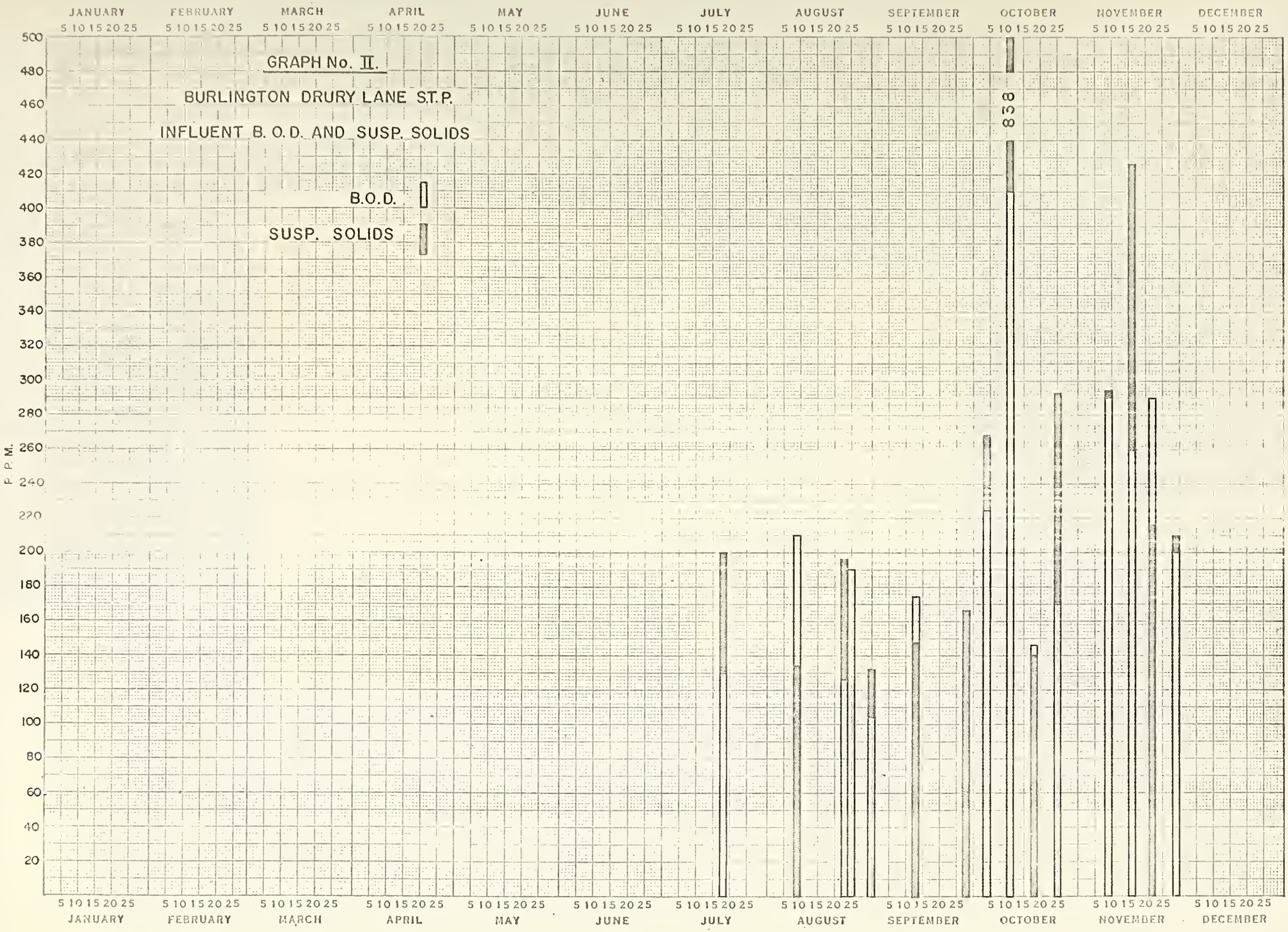

GRAPH No. II.

BURLINGTON DRURY LANE S.T.P.

INFLUENT B. O. D. AND SUSP. SOLIDS

ONTARIO WATER RESOURCES COMMISSION.
DIVISION OF PLANT OPERATIONS.
BURLINGTON - DRURY LANE. SEWAGE
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